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0095

Ten Year Risk of Progression From Fasting Hyperglycemia to Overt Diabetes: Effects of Changing the Definition of Diabetes.

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To determine the rate of progression from fasting hyperglycemia to overt diabetes mellitus (DM) we used the Mayo Clinic Laboratory Information Systems database to assemble a cohort of 7915 Olmsted County, MN residents of ≥ 40 yrs (mean age 61 ± 13 yrs; 39% male) who had a fasting plasma glucose (FPG) level < 125 mg/dL between July 1983 and December 1986. The cohort was followed until December 1995 with all FPG levels examined. DM was defined as at least 2 FPGs ≥ 140 mg/dL (NDDG criterion) or ≥ 125 mg/dL (proposed new ADA/WHO criterion). The absence of DM at baseline was confirmed by review of the complete medical record. For individuals with baseline FPG levels < 100 , 100-112 and 113-124 mg/dL the estimated 10-year risks (Kaplan-Meier) of progression to "NDDG DM" were 2, 13 and 36% ($p < 0.0001$) and to "ADA/WHO DM" 7, 19 and 51% respectively ($p < 0.0001$). Among the 778 individuals who developed "ADA/WHO DM" 445 (57%) went on to develop "NDDG DM" within the period of follow-up. 213 individuals (27%) met both criteria simultaneously. Of those who developed "ADA/WHO DM" first and "NDDG DM" subsequently the median interval between the two events was 1.2 yrs (interquartile range 0.3-3.4 yrs). Our data indicate that individuals with any degree of fasting hyperglycemia are at substantial risk for progressing to overt DM regardless of the criteria used to define DM.

0096

Incident NIDDM in a Community-Based Biracial Cohort: The Atherosclerosis Risk in Communities Study.

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Although the excess prevalence of NIDDM in blacks is well established, incident NIDDM has not been well studied in this group. We therefore conducted a prospective study of 2,608 black and 9,564 white non-diabetic adults, aged 45-64, from four US communities, who participated in the ARIC Study. Over 90% of blacks came from one center (Jackson, Miss). NIDDM, assessed every 3 yrs, was defined by physician diagnosis, medication use, or fasting glucose ≥ 140 mg/dL. At baseline, compared to their white counterparts, black women had higher body-mass index (BMI; 30.4 vs 26.3 kg/m²) and similar waist-to-hip ratio (WHR; 0.89 vs 0.89) while black men had similar BMI (27.4 vs 27.2) and lower WHR (0.93 vs 0.97). Among women (Baecke index: 2.10 vs 2.43) and men (2.28 vs 2.69), blacks reported less sports-related physical activity than whites. Over 6 yrs of follow-up, there were 172 incident cases of NIDDM in black women (18.8/1000 PY); 225 in white women (7.5/1000 PY); 89 in black men (16.3/1000 PY); and 291 in white men (11.4/1000 PY). Thus, the risk of NIDDM was greater in black women (Odds Ratio [OR]=2.52; 95%CI 2.05-3.11) and black men (OR=1.39; 95%CI 1.08-1.80) than in their white counterparts. BMI was positively associated with incident NIDDM in blacks and whites, but was stronger in whites (e.g. OR for top vs lowest quartile 11.3; 95%CI 7.0-18.3 in white women vs 4.7; 95%CI 2.9-7.6 in black women). WHR displayed a similar pattern. Sports activity was inversely associated with incident NIDDM in whites (OR=0.83; 95%CI 0.69-0.99 per index unit in white women), but not blacks (OR=1.15, 95%CI 0.90-1.46 in black women). In logistic regression models which adjusted simultaneously for age, education, family history of NIDDM, BMI, WHR, and sports activity, black women (OR=1.63; 95%CI 1.28-2.09) and black men (OR=1.67; 95%CI 1.25-2.33) remained at higher risk than their white counterparts. While confounding due to differential geographic distribution cannot be ruled out, these data suggest that the risk of incident NIDDM is substantially greater in blacks than in whites, especially among women. Black-white differences in established diabetes risk factors only partly account for this disparity.

ADA Funded Research

0097

Carotid Wall Thickness Across the Range of Glucose Tolerance: The Insulin Resistance Atherosclerosis Study (IRAS).

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The risk of coronary heart disease (CHD) is increased in diabetics compared to non-diabetics. Some, but not all studies, report that persons with impaired glucose tolerance (IGT) exhibit risk that is intermediate. We studied this question in IRAS, an epidemiologic cohort study of African American, Hispanic and Caucasian men and women, approximately equally divided among normal glucose tolerance, IGT, and non-insulin dependent diabetes (NIDDM). (About half of the NIDDMs were newly diagnosed at the IRAS baseline examination by WHO criteria.) NIDDMs taking insulin were excluded from IRAS. Common and internal carotid wall thickness were measured in 1509 participants using B-mode ultrasound - a measure of subclinical atherosclerosis. Adjusted for age, sex, ethnicity and clinical center, internal carotid wall thickness increased in a stepwise fashion for normal, IGT, new NIDDM, and previously diagnosed NIDDM: 846, 865, 887, 951 μ m, respectively ($p < 0.0001$ for trend). Further adjustment for hypertension, BMI, smoking, insulin resistance, LDL, HDL and TG had little effect on this trend ($p = 0.004$). Pairwise comparisons indicated that previously diagnosed diabetics had significantly greater wall thickness than all other groups (64 to 105 μ m greater). However, the other groups (normal, IGT, and new NIDDM) did not differ significantly from each other. Common carotid wall thickness yielded similar findings. In summary, we found intermediate levels of wall thickness in IGTs, as well as a considerably greater wall thickness among previously diagnosed diabetics compared to all other glucose tolerance groups. These data have implications for preventive efforts directed both before and after the onset of clinically recognized NIDDM.

0098

Increased Risk for Cardiovascular Disease by High Homocysteine is Related to Glucose Tolerance: The Hoorn Study.ELLEN HOOGEVEEN¹, ROB HEINE^{*1,2}, PIETER KOSTENSE¹, CORNELIS JAKOBS³, LEX BOUTER¹, COEN STEHOUWER^{1,2}.¹Institute for Research in Extramural Medicine, ²Department of Internal Medicine and ³Clinical Chemistry, Vrije Universiteit Amsterdam, The Netherlands

High serum total homocysteine is an important risk factor for cardiovascular disease. To investigate the relationship between high serum total homocysteine and cardiovascular disease in relation to glucose tolerance we studied an age-, sex- and glucose tolerance stratified sample ($n = 631$) of a 50-74 year old general Caucasian population.

Glucose tolerance was assessed by means of two oral glucose tolerance tests, except in subjects with non-insulin-dependent diabetes mellitus (NIDDM) who were treated with insulin and/or hypoglycemic agents. Cardiovascular history, ECGs, ankle brachial pressure indices and Doppler flow velocity curves were obtained from 288 subjects with normal glucose tolerance (NGT), 170 with impaired glucose tolerance (IGT) and 173 with NIDDM. High serum total homocysteine was defined as > 14.0 μ mol/L. Cardiovascular disease was defined as a history of cerebrovascular disease, myocardial infarction, coronary artery bypass grafting, (a) Minnesota Code(s) indicative of at least probable ischemic heart disease, peripheral arterial surgery or amputation, aortoiliac obstruction and/or multi-level arterial disease.

After stratification of the three glucose tolerance categories, we performed a logistic regression analysis. After adjustment for age, sex, hypertension, smoking and serum total cholesterol, the odds ratios (95% CIs) of cardiovascular disease for high serum total homocysteine were 1.46 (0.52-4.10) in NGT, 1.64 (0.53-5.05) in IGT and 5.24 (1.91-14.34) in NIDDM.

We conclude that high serum total homocysteine is a stronger (3-fold) risk factor for cardiovascular disease in non-insulin-dependent diabetes mellitus than in subjects with normal and impaired glucose tolerance.

A numeral beside an author's name indicates a duality of interest. See Duality of Interest Information beginning on page lxxxvii.